



SEQUENCE LISTING

<110> Smith, Michael D.
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Rosenthal, Kim

<120> Thermostable Reverse Transcriptases and Uses Thereof

<130> 0942.5040001/RWE/AWL

<140> US 09/845,157
<141> 2001-05-01

<150> US 60/207,196
<151> 2000-05-26

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<170> PatentIn version 3.0

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<213> Moloney-Murine Leukemia Virus

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Gly Gly Gln Gln Met Gly Arg Asp Leu Tyr Asp Asp Asp Lys His
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Met Thr Leu Asn Ile Glu Asp Glu Tyr Arg Leu His Glu Thr Ser Lys
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gag cca gat gtt tct cta ggg tcc aca tgg ctg tct gat ttt cct cag 192
Glu Pro Asp Val Ser Leu Gly Ser Thr Trp Leu Ser Asp Phe Pro Gln
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gcc tgg gcg gaa acc ggg ggc atg gga ctg gca gtt cgc caa gct cct 240
Ala Trp Ala Glu Thr Gly Gly Met Gly Leu Ala Val Arg Gln Ala Pro
65 70 75 80

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aga ctg ttg gac cag gga ata ctg gta ccc tgc cag tcc ccc tgg aac Arg Leu Leu Asp Gln Gly Ile Leu Val Pro Cys Gln Ser Pro Trp Asn 115 120 125	384
acg ccc ctg cta ccc gtc aag aaa ccc ggg act aat gat tac agg cct Thr Pro Leu Leu Pro Val Lys Lys Pro Gly Thr Asn Asp Tyr Arg Pro 130 135 140	432
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ctc cac ccg acg tct cag cct ctc ttc gcc ttt gaa tgg aga gac cca Leu His Pro Thr Ser Gln Pro Leu Phe Ala Phe Glu Trp Arg Asp Pro 195 200 205	624
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act cgg gcc ctg tta caa acc cta gga gac ctc ggg tat cgg gcc tcg Thr Arg Ala Leu Leu Gln Thr Leu Gly Asp Leu Gly Tyr Arg Ala Ser 275 280 285	864
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ctt cta aaa gag ggt cag aga tgg ctg act gag gcc aga aaa gag act	960
Leu Leu Lys Glu Gly Gln Arg Trp Leu Thr Glu Ala Arg Lys Glu Thr	
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gtg atg ggg cag cct act ccg aag acc ccg cggtt cta agg gag ttc	1008
Val Met Gly Gln Pro Thr Pro Lys Thr Pro Arg Gln Leu Arg Glu Phe	
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Leu Gly Thr Ala Gly Phe Cys Arg Leu Trp Ile Pro Gly Phe Ala Glu	
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Met Ala Ala Pro Leu Tyr Pro Leu Thr Lys Thr Gly Thr Leu Phe Asn	
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Lys Leu Gly Pro Trp Arg Arg Pro Val Ala Tyr Leu Ser Lys Lys Leu	
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Pro Asp Arg Trp Leu Ser Asn Ala Arg Met Thr His Tyr Gln Ala Leu	
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Leu Leu Asp Thr Asp Arg Val Gln Phe Gly Pro Val Val Ala Leu Asn	
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Pro Ala Thr Leu Leu Pro Leu Pro Glu Glu Gly Leu Gln His Asn Cys	
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Gln	Pro	Leu	Pro	Asp	Ala	Asp	His	Thr	Trp	Tyr	Thr	Gly	Gly	Ser	Ser
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acc gag gta atc tgg gct aaa gcc ctg cca gcc ggg aca tcc gct cag															1776
Thr	Glu	Val	Ile	Trp	Ala	Lys	Ala	Leu	Pro	Ala	Gly	Thr	Ser	Ala	Gln
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cg gct cag ctg ata gca ctc acc cag gcc cta agg atg gca gaa ggt															1824
Arg	Ala	Gln	Leu	Ile	Ala	Leu	Thr	Gln	Ala	Leu	Arg	Met	Ala	Glu	Gly
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Lys	Lys	Leu	Asn	Val	Tyr	Thr	Asn	Ser	Arg	Tyr	Ala	Phe	Ala	Thr	Ala
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His	Ile	His	Gly	Glu	Ile	Tyr	Arg	Arg	Gly	Leu	Leu	Thr	Ser	Glu	
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ggc aaa gag atc aaa aat aag gac gag ata ttg gcc cta cta aaa gcc															1968
Gly	Lys	Glu	Ile	Lys	Asn	Lys	Asp	Glu	Ile	Leu	Ala	Leu	Leu	Lys	Ala
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ctc ttt ctg ccc aaa aga ctt agc ata atc cat tgt cca gga cat caa															2016
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Ala Trp Ala Glu Thr Gly Gly Met Gly Leu Ala Val Arg Gln Ala Pro
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Thr Pro Leu Leu Pro Val Lys Lys Pro Gly Thr Asn Asp Tyr Arg Pro
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Val Gln Asp Leu Arg Glu Val Asn Lys Arg Val Glu Asp Ile His Pro
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Thr Val Pro Asn Pro Tyr Asn Leu Leu Ser Gly Leu Pro Pro Ser His
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Gln Trp Tyr Thr Val Leu Asp Leu Lys Asp Ala Phe Phe Cys Leu Arg
 180 185 190

Leu His Pro Thr Ser Gln Pro Leu Phe Ala Phe Glu Trp Arg Asp Pro
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Phe Lys Asn Ser Pro Thr Leu Phe Asp Glu Ala Leu Arg Arg Asp Leu
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Ala Asp Phe Arg Ile Gln His Pro Asp Leu Ile Leu Leu Gln Tyr Val
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Asp Asp Leu Leu Ala Ala Thr Ser Glu Leu Asp Cys Gln Gln Gly
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 Lys Leu Gly Pro Trp Arg Arg Pro Val Ala Tyr Leu Ser Lys Lys Leu
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 Pro Ala Thr Leu Leu Pro Leu Pro Glu Glu Gly Leu Gln His Asn Cys
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His Ile His Gly Glu Ile Tyr Arg Arg Arg Gly Leu Leu Thr Ser Glu
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Gly Lys Glu Ile Lys Asn Lys Asp Glu Ile Leu Ala Leu Leu Lys Ala
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Leu Phe Leu Pro Lys Arg Leu Ser Ile Ile His Cys Pro Gly His Gln
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Lys Gly His Ser Ala Glu Ala Arg Gly Asn Arg Met Ala Asp Gln Ala
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gctatgacca tgattacgccc aagcttgcattt gcctgcaggctt cgactctaga ggatccccgg 180
gtaccgagctt cgaatttcaactt ggccgtcggtt ttacaacgtc gtgactggaa aaaccctggc 240
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Glu Pro Asp Val Ser Leu Gly Ser Thr Trp Leu Ser Asp Phe Pro Gln
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gcc tgg gcg gaa acc ggg ggc atg gga ctg gca gtt cgc caa gct cct 144
Ala Trp Ala Glu Thr Gly Gly Met Gly Leu Ala Val Arg Gln Ala Pro
35 40 45
ctg atc ata cct ctg aaa gca acc tct acc ccc gtg tcc ata aaa caa 192
Leu Ile Ile Pro Leu Lys Ala Thr Ser Thr Pro Val Ser Ile Lys Gln
50 55 60
tac ccc atg tca caa gaa gcc aga ctg ggg atc aag ccc cac ata cag 240
Tyr Pro Met Ser Gln Glu Ala Arg Leu Gly Ile Lys Pro His Ile Gln
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aga ctg ttg gac cag gga ata ctg gta ccc tgc cag tcc ccc tgg aac 288

Arg	Leu	Leu	Asp	Gln	Gly	Ile	Leu	Val	Pro	Cys	Gln	Ser	Pro	Trp	Asn	
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Thr	Pro	Leu	Leu	Pro	Val	Lys	Lys	Pro	Gly	Thr	Asn	Asp	Tyr	Arg	Pro	
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																105
																110
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Val	Gln	Asp	Leu	Arg	Glu	Val	Asn	Lys	Arg	Val	Glu	Asp	Ile	His	Pro	
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																125
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Thr	Val	Pro	Asn	Pro	Tyr	Asn	Leu	Leu	Ser	Gly	Leu	Pro	Pro	Ser	His	
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																135
																140
cag	tgg	tac	act	gtg	ctt	gat	tta	aag	gat	gcc	ttt	ttc	tgc	ctg	aga	480
Gln	Trp	Tyr	Thr	Val	Leu	Asp	Leu	Lys	Asp	Ala	Phe	Phe	Cys	Leu	Arg	
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ctc	cac	ccc	acc	agt	cag	cct	ctc	ttc	gcc	ttt	gag	tgg	aga	gat	cca	528
Leu	His	Pro	Thr	Ser	Gln	Pro	Leu	Phe	Ala	Phe	Glu	Trp	Arg	Asp	Pro	
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																170
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gag	atg	gga	atc	tca	gga	caa	ttg	acc	tgg	acc	aga	ctc	cca	cag	ggt	576
Glu	Met	Gly	Ile	Ser	Gly	Gln	Leu	Thr	Trp	Thr	Arg	Leu	Pro	Gln	Gly	
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																190
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Phe	Lys	Asn	Ser	Pro	Thr	Leu	Phe	Asp	Glu	Ala	Leu	His	Arg	Asp	Leu	
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Ala	Asp	Phe	Arg	Ile	Gln	His	Pro	Asp	Leu	Ile	Leu	Leu	Gln	Tyr	Val	
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																215
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																230
																235
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act	cg	gcc	ctg	tta	caa	acc	cta	ggg	aac	ctc	ggg	tat	cg	gcc	tc	768
Thr	Arg	Ala	Leu	Leu	Gln	Thr	Leu	Gly	Asn	Leu	Gly	Tyr	Arg	Ala	Ser	
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gcc	aag	aaa	gcc	caa	att	tgc	cag	aaa	cag	gtc	aag	tat	ctg	ggg	tat	816
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																280
																285
gtg	atg	ggg	cag	cct	act	ccg	aag	acc	cct	cga	caa	cta	agg	gag	ttc	912
Val	Met	Gly	Gln	Pro	Thr	Pro	Lys	Thr	Pro	Arg	Gln	Leu	Arg	Glu	Phe	
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																295
																300
cta	ggg	acg	gca	ggc	ttc	tgt	cgc	ctc	tgg	atc	cct	ggg	ttt	gca	gaa	960
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atg gca gcc ccc ttg tac cct ctc acc aaa acg ggg act ctg ttt aat Met Ala Ala Pro Leu Tyr Pro Leu Thr Lys Thr Gly Thr Leu Phe Asn	325	330	335	1008	
tgg ggc cca gac caa caa aag gcc tat caa gaa atc aag caa gct ctt Trp Gly Pro Asp Gln Gln Lys Ala Tyr Gln Glu Ile Lys Gln Ala Leu	340	345	350	1056	
cta act gcc cca gcc ctg ggg ttg cca gat ttg act aag ccc ttt gaa Leu Thr Ala Pro Ala Leu Gly Leu Pro Asp Leu Thr Lys Pro Phe Glu	355	360	365	1104	
ctc ttt gtc gac gag aag cag ggc tac gcc aaa ggt gtc cta acg caa Leu Phe Val Asp Glu Lys Gln Gly Tyr Ala Lys Gly Val Leu Thr Gln	370	375	380	1152	
aaa ctg gga cct tgg cgt cgg cct gtg gcc tac ctg tcc aaa aag cta Lys Leu Gly Pro Trp Arg Arg Pro Val Ala Tyr Leu Ser Lys Lys Leu	385	390	395	400	1200
gac cca gta gca gct ggg tgg ccc cct tgc cta cgg atg gta gca gcc Asp Pro Val Ala Ala Gly Trp Pro Pro Cys Leu Arg Met Val Ala Ala	405	410	415		1248
att gcc gta ctg aca aag gat gca ggc aag cta acc atg gga cag cca Ile Ala Val Leu Thr Lys Asp Ala Gly Lys Leu Thr Met Gly Gln Pro	420	425	430		1296
cta gtc att ctg gcc ccc cat gca gta gag gca cta gtc aaa caa ccc Leu Val Ile Leu Ala Pro His Ala Val Glu Ala Leu Val Lys Gln Pro	435	440	445		1344
ccc gac cgc tgg ctt tcc aac gcc cgg atg act cac tat cag gcc ttg Pro Asp Arg Trp Leu Ser Asn Ala Arg Met Thr His Tyr Gln Ala Leu	450	455	460		1392
ctt ttg gac acg gac cgg gtc cag ttc gga ccg gtg gta gcc ctg aac Leu Leu Asp Thr Asp Arg Val Gln Phe Gly Pro Val Val Ala Leu Asn	465	470	475	480	1440
ccg gct acg ctg ctc cca ctg cct gag gaa ggg ctg caa cac aac tgc Pro Ala Thr Leu Leu Pro Leu Pro Glu Glu Gly Leu Gln His Asn Cys	485	490	495		1488
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 <213> Moloney-Murine Leukemia Virus

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Leu Ile Ile Pro Leu Lys Ala Thr Ser Thr Pro Val Ser Ile Lys Gln
50 55 60

Tyr Pro Met Ser Gln Glu Ala Arg Leu Gly Ile Lys Pro His Ile Gln
65 70 75 80

Arg Leu Leu Asp Gln Gly Ile Leu Val Pro Cys Gln Ser Pro Trp Asn
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Thr Pro Leu Leu Pro Val Lys Lys Pro Gly Thr Asn Asp Tyr Arg Pro
100 105 110

Val Gln Asp Leu Arg Glu Val Asn Lys Arg Val Glu Asp Ile His Pro
115 120 125

Thr Val Pro Asn Pro Tyr Asn Leu Leu Ser Gly Leu Pro Pro Ser His
130 135 140

Gln Trp Tyr Thr Val Leu Asp Leu Lys Asp Ala Phe Phe Cys Leu Arg
145 150 155 160

Leu His Pro Thr Ser Gln Pro Leu Phe Ala Phe Glu Trp Arg Asp Pro
165 170 175

Glu Met Gly Ile Ser Gly Gln Leu Thr Trp Thr Arg Leu Pro Gln Gly
180 185 190

Phe Lys Asn Ser Pro Thr Leu Phe Asp Glu Ala Leu His Arg Asp Leu
195 200 205

Ala Asp Phe Arg Ile Gln His Pro Asp Leu Ile Leu Leu Gln Tyr Val
210 215 220

Asp Asp Leu Leu Ala Ala Thr Ser Glu Leu Asp Cys Gln Gln Gly
225 230 235 240

Thr Arg Ala Leu Leu Gln Thr Leu Gly Asn Leu Gly Tyr Arg Ala Ser
245 250 255

Ala Lys Lys Ala Gln Ile Cys Gln Lys Gln Val Lys Tyr Leu Gly Tyr
260 265 270

Leu Leu Lys Glu Gly Gln Arg Trp Leu Thr Glu Ala Arg Lys Glu Thr
275 280 285

Val Met Gly Gln Pro Thr Pro Lys Thr Pro Arg Gln Leu Arg Glu Phe
290 295 300

Leu Gly Thr Ala Gly Phe Cys Arg Leu Trp Ile Pro Gly Phe Ala Glu
305 310 315 320

Met Ala Ala Pro Leu Tyr Pro Leu Thr Lys Thr Gly Thr Leu Phe Asn
325 330 335

Trp Gly Pro Asp Gln Gln Lys Ala Tyr Gln Glu Ile Lys Gln Ala Leu
340 345 350

Leu Thr Ala Pro Ala Leu Gly Leu Pro Asp Leu Thr Lys Pro Phe Glu
355 360 365

Leu Phe Val Asp Glu Lys Gln Gly Tyr Ala Lys Gly Val Leu Thr Gln
370 375 380

Lys Leu Gly Pro Trp Arg Arg Pro Val Ala Tyr Leu Ser Lys Lys Leu
385 390 395 400

Asp Pro Val Ala Ala Gly Trp Pro Pro Cys Leu Arg Met Val Ala Ala
405 410 415

Ile Ala Val Leu Thr Lys Asp Ala Gly Lys Leu Thr Met Gly Gln Pro
420 425 430

Leu Val Ile Leu Ala Pro His Ala Val Glu Ala Leu Val Lys Gln Pro
435 440 445

Pro Asp Arg Trp Leu Ser Asn Ala Arg Met Thr His Tyr Gln Ala Leu
450 455 460 460

Leu Leu Asp Thr Asp Arg Val Gln Phe Gly Pro Val Val Ala Leu Asn
465 470 475 480

Pro Ala Thr Leu Leu Pro Leu Pro Glu Glu Gly Leu Gln His Asn Cys
485 490 495

Leu Asp Asn Ser Arg Leu Ile Asn
500